

SUMMARY OF THE INVENTION

Accordingly, in view of above problems, an object of the present invention is to provide a recording/reproducing apparatus including an auto changer for a disk-like recording medium which is capable of storing numerous disks and forming the construction compact by reducing its height and width.

Another object of the present invention is to provide a recording/reproducing apparatus including an auto changer for a disk-like recording medium which is capable of storing numerous disks, increasing guide grooves in a tray stocker, realizing a compact construction by disposing a plurality of tray stockers in parallel with each other, and providing a single record/reproduce device for common use among a plurality of tray stockers. Thereby, the production cost can be suppressed within a reasonable range.

Furthermore, another object of the present invention is to provide a recording/reproducing apparatus including an auto changer for a disk-like recording medium which is capable of storing numerous disks and simultaneously extracting a plurality of disks (trays) of the same height by the use of a pair of symmetrically bifurcated extraction claws.

Still further, another object of the present invention is to provide a recording/reproducing apparatus including an auto changer for a disk-like recording medium which is capable of storing numerous disks and quickly completing an access to a disk by the simplified and compacted structure of the lifter.

Yet further, another object of the present invention is to provide a recording/reproducing apparatus including an auto changer for a disk-like recording medium which is capable of storing numerous disks and assuring a highly accurate positioning of a shift mechanism.

Moreover, another object of the present invention is to provide a recording/reproducing apparatus including an auto changer which is capable of allowing a disk (i.e. tray) to be inserted or pulled out even if the recording/reproducing of another disk is not finished yet and detecting opening/closing of the door of a tray stocker by means of a simplified detecting means.

Still further, another object of the present invention is to provide a door opening/closing detecting mechanism for an auto player which is capable of surely detecting the opening/closing of the door of the auto player.

In order to accomplish each of the above objects, a first aspect of the present invention provides a recording/reproducing apparatus including an auto changer for a disk-like recording medium comprising:

- a plurality of trays, each accommodating a recording medium such as a compact disk;
- at least two tray stockers disposed in parallel with each other, said tray stockers having multistage guide grooves storing said plurality of trays, said guide grooves being configured so as to insert a tray accommodating said recording medium from a front end thereof and extract it from a rear end thereof;
- a lifter disposed behind said tray stockers;
- a tray extracting mechanism provided on said lifter and having disk clampers of the same number as said tray stockers, said tray extracting mechanism simultaneously engaging with a plurality of trays disposed at the same height of said tray stockers when extracting trays;
- said lifter receiving said plurality of trays extracted by said tray extracting mechanism and transporting said plurality of trays vertically downwardly; and

record/reproduce means disposed below said lifter for receiving a selected recording medium from said trays and placing it in position for recording/reproducing.

Furthermore, a second aspect of the present invention provides a recording/reproducing apparatus in accordance with the above first aspect, further comprising:

a plurality of doors being provided to close said front end of the tray stockers and being opened in response to a door open command;

record/reproduce division judging means for judging a tray stocker division to which said selected recording medium belongs on the basis of opening of said doors; and

door control means for locking a door relating to said tray stocker division and unlocking other door.

Still further, a third aspect of the present invention provides a recording/reproducing apparatus in accordance with the above first aspect, further comprising:

a door provided to close said front end of the tray stockers;

a door locking member for locking and unlocking said door;

a door linkage mechanism linked with said door locking member so as to depart from an locked position in response to an opening of said door;

detecting means for detecting the opening of said door on the basis of a movement of said door linkage mechanism; and

record/reproduce control means for prohibiting said record/reproduce means to perform recording/reproducing of said selected recording medium when said door is opened.

Yet further, a fourth aspect of the present invention provides a recording/reproducing apparatus in accordance with the above first aspect, wherein said lifter is associated with a swing arm connected with said lifter through a speed reduction mechanism so as to cause a swing motion in response to a vertical shift motion of said lifter, and said swing arm is urged by a spring against weight of said lifter.

Moreover, a fifth aspect of the present invention provides an auto player comprising:

a plurality of tray stockers disposed in parallel with each other, said tray stockers having multistage guide grooves storing a plurality of recording mediums;

a lifter serving as a disk changer for selectively extracting a recording medium from said tray stockers and transporting it in a vertical direction;

record/reproduce means disposed below said lifter and being shiftable to a position right below a selected recording medium for receiving and placing it in position for recording/reproducing;

a shift mechanism defined by a rack and a partially geared pinion for shifting said record/reproduce means, said rack being formed on said record/reproduce means, said partially geared pinion being formed thereon with a geared portion meshing with said rack so as to drive said rack in response to a rotation of said partially geared pinion and a non-geared portion disengaging said rack from said partially geared pinion; and

a lock mechanism integrally shifting together with said partially geared pinion, said lock mechanism engaging with said record/reproduce means when said rack is disengaged from said partially geared pinion.

Still further, a sixth aspect of the present invention provides a recording/reproducing apparatus including an auto changer for a disk-like recording medium comprising: